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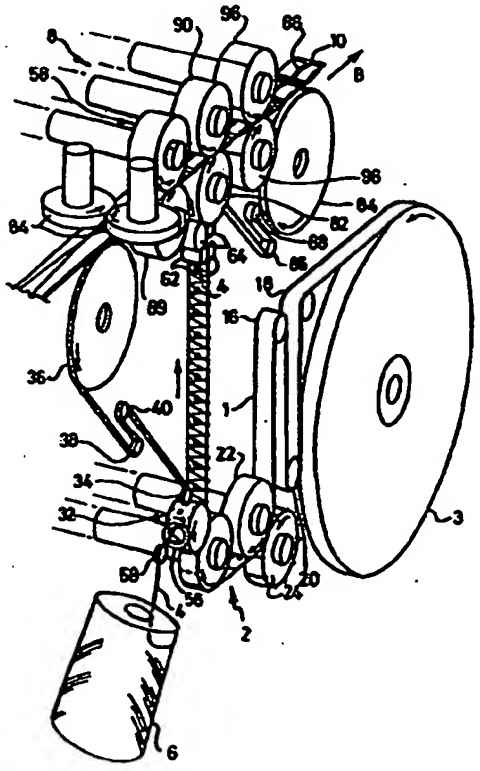
(54) Title: METHOD AND APPARATUS FOR ATTACHING A TAG AND A THREAD TO A PRODUCT

(57) Abstract

Each of a plurality of tags is provided with a respective length of thread (4) for attaching the tag to a product, such as an infusion package (for example a tea bag). A thread is fed to an array of protuberances (e.g. 50, 52) via a rotating guide (56). Relative movement of the protuberances and the guide cause the thread to be retained on the protuberances in a generally coiled or serpentine condition, prior to the thread being transferred from the protuberances to the tags (e.g. 70, 71). In addition, a series of tags, each firmly attached to respective portion of threads, can be attached to corresponding products by feeding a stream of the tags and thread to a stream of products and, at the confluence of the streams, releasably attaching each tag to its product and firmly attaching the associated length of thread to the product so that the tags can be separated from the products while still being connected thereto by the thread, each tag and/or associated portion of thread spanning its product from the leading to the trailing peripheral regions. There is also shown an infusion packaging having a tag and thread attached thereto, the tag being releasably attached to the package at one peripheral region of the latter, the thread being firmly attached to the package at the opposition peripheral region, the thread also being attached to the tag.



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TITLE: METHOD AND APPARATUS FOR ATTACHING A TAG AND A THREAD TO A PRODUCT

Field of the Invention

This invention relates to tags, made primarily of sheet material such as paper or card, which incorporate a thread, string or similar filamentary material via which the tags can be attached to products. More specifically, the invention relates to a method of providing each of a plurality of tags with a respective length of thread, apparatus for performing that method, a method of attaching a series of tags to a corresponding series of products and to an infusion package having a tag and thread attached thereto.

Background to the invention

The most familiar application of tags of this sort is in tea bags, which are commonly provided with a tag and thread by which the spent tea bag can be extracted from a tea cup or tea pot.

In one known arrangement, the thread is simply attached at either end to the tag and the bag, but the exposed length of thread between the tag and the bag can produce problems in handling and packaging because of the propensity of length of thread to become entangled with their surroundings and with one another.

PCT Patent Application No. PCT/GB94/00721 (publication No. WO 94/22721) proposes a tag which takes the form of an envelope in which a length of thread is stored in a generally coiled or serpentine condition. The envelope is formed with two separable parts, one of which is firmly attached to the tea bag, the thread being unravelled from within the envelope when the two portions are separated. The apparatus envisaged for

making the tags uses an oscillating lever via which thread is supplied to the material to form the tag before the latter is folded to provide the envelope. The lever causes corresponding oscillations of the thread so that the thread is in a serpentine condition when it reaches the material to form the tag.

The initial containment of the thread in the envelope avoids the packaging handling problems mentioned above, but the process required to make the tags is believed to place constraints on the rate at which tags can be made.

The present invention aims to provide tags which avoid the problems posed by exposed lengths of thread, but which can also be manufactured rapidly.

Summary of the Invention

According to a first aspect of the invention, there is provided a method of providing each of a plurality of tags with a respective length of thread for attaching the tag to a product, the method comprising the steps of:

a) Feeding the thread to an array of protuberances via a rotating guide for causing orbital motion of the thread being fed to the protuberances;

b) During said feeding, causing relative movement of the array of protuberances and the guide so that the protuberances move past the orbital path of the thread such that the thread is applied to the protuberances which retain the thread in a generally coiled or serpentine condition; and

c) Transferring the thread from the protuberances to the tags and attaching the thread to the latter.

The term "thread" is used herein to include any suitable

filamentary material (whether of natural or synthetic material, or a mixture thereof) including string, fibre or yarn.

The rotating guide, operating in conjunction with the protuberances, can form the thread into a generally coiled or serpentine shape more rapidly than can the oscillating lever shown in WO 94/22721. The invention thus enables the tags to be provided with the thread (in its desired configuration) relatively rapidly.

Preferably, step c) of the method comprises the steps of firmly attaching a respective first portion of each length of thread to its respective tag, and lightly adhering a respective second portion of each length to the tag, wherein the second portion is releasably retained on the tag in its generally coiled or serpentine condition, and wherein the length of thread includes a third portion, spaced from the first portion by the second portion, available for attachment to the respective product.

With the thread and tag so attached to the product, the second portion is stored against the tag which is consequently held in relatively close proximity to the product. However, the second portion can be released from the tag to allow the latter to be moved away from the product.

Preferably, the tags are contiguously arranged when the thread is transferred, preferably continuously, from the protuberances.

In such a case, the thread may to advantage be transferred from the protuberances to a carrier strip which is subsequently separated into portions, each of which constitutes a respective tag.

Preferably, the thread for the tags is continuous when it is applied to the strip, and then cut to provide individual lengths. Preferably, the thread is not cut before it is

attached to the product.

During the separation of portions of the strip to form the tags, part of the lightly adhered thread is released from the tags so that the third portion of each length of thread is spaced from its respective tag.

If enough thread separates the third portion from the tag, the tag can be attached at or near one peripheral region of the product, and the third portion of the thread to the opposite peripheral region of the product, thus allowing the tags and the thread to be continuously fed to a succession of products larger than the tags.

This allows tags to be supplied at a much faster rate than would be the case if the supply of tags to a stream of products had to be intermittent so that the rate of supply of tags does not exceed that of the products.

Conveniently, the orbital motion of the thread being fed from the guide to the protuberances is circular about the axis of rotation of the guide.

Preferably, the protuberances are arranged in staggered pairs, the members of each of which are positioned one on either side of the axis of rotation of the guide as that pair moves past the guide, and the relative movement of the guide and the protuberances is such that the pairs of protuberances receive the thread in succession.

Preferably, the rotational speed of the guide and speed of said relative movement are such that, for each pair of protuberances, the thread passes part way round one of the protuberance, and is looped around the other protuberance.

Conveniently, the protuberances are mounted on a drum, and said relative movement is achieved by rotating the drum about its

axis, which is preferably perpendicular to the axis of rotation of the guide.

In this case, each length of thread may be firmly attached to its respective tag at its first region by the steps of applying a respective adhesive tab to a portion of the drum which is not carrying any thread, so that the thread subsequently applied to that portion overlies the tab, and subsequently applying the tab to the tag such that the first portion of the thread is sandwiched between tab and tag.

This enables the steps of firmly adhering a thread to the tags and transferring the thread from the protuberances to the tags to be combined.

According to a second aspect of the invention, there is provided apparatus for performing the method of the first aspect of the invention, the apparatus comprising feed means for feeding thread to an array of protuberances, the feed means comprising a guide and means for rotating the guide so that the direction of feed of the thread moves about an orbital path, means for moving the protuberances such that they move past said orbital path, wherein the relative positions of the guide and the protuberances are such that the thread is applied to and retained on the protuberances in a generally serpentine or coiled condition, tag supply means for supplying a succession of tags to those protuberances on which the thread is retained and transfer means for transferring the thread from the protuberances to the tags and attaching thread thereto.

Preferably, the apparatus is adapted for use with tags which carry an adhesive coating, the transfer means being arranged to bring the thread, retained on the protuberances, into contact with the adhesive coatings.

Additionally or alternatively, the transfer means may to advantage comprise adhesive tab supply means for supplying

adhesive tabs to the thread and application means for applying the tabs to the tags thereby to attach the thread to the latter.

Preferably, the tag supply means is operable to supply a continuous support strip to the thread on the protuberances, the transfer means is operable to transfer the thread from the protuberances to the strip, and the apparatus includes separation means for subsequently separating the strip into a plurality of portions, each constituting a respective tag which carries a respective length of thread.

Preferably, the protuberances are mounted on a drum, from which they project radially, the drum axis being preferably perpendicular to the axis of rotation of the guide, and the means for moving the protuberances relative to the guide comprises rotation means for rotating the drum.

Where tabs are used to attach the thread to the tags, the tab supply means preferably comprises the drum, the arrangement being such that for each revolution of the drum, at least one tab is applied to a respective portion of the drum before the thread is applied to that portion, the drum including tab retaining means for retaining each tab thereon at least until the tab is brought into contact with the thread.

Retaining means conveniently comprises a series of apertures which are in the drum and which are connected to suction means, operable to retain said tabs on the drum until they are attached to the thread.

According to a third aspect of the invention, there is provided a method of attaching a series of tags, each being firmly attached to a respective portion of thread, to a series of corresponding products, the method comprising the steps of feeding a stream of the tags and thread to a stream of products, each product having a leading peripheral region and

a trailing peripheral region which are respectively the first and last portion of the product to reach the confluence of the streams, releasably attaching each tag to its respective product and firmly attaching the associated length of thread to the product so that the tags can be separated from the product while still being connected thereto by the thread, wherein the tag and/or the thread spans the product from the leading to the trailing peripheral region.

This means that the tags and thread and the products can be supplied at the same speed, such that the tags can be applied to the products in a continuous manner. This in turn enables the tags to be applied to the products more rapidly than would be the case if an intermittent feed of tags were required.

Conveniently, each tag is releasably attached to the product at either the leading or the trailing peripheral region on its respective product, and the thread is firmly attached to the opposite peripheral region of the product. Thus, the tag and thread can be attached to their respective products at the confluence of the streams.

Preferably, the tag is releasably attached to the trailing peripheral region of the product, and the thread is firmly attached to the leading peripheral region of the product.

Where the tag is too small to span the product from the leading to the trailing peripheral region, it will be appreciated that only part of the product between the two regions will be spanned by the tag and the rest will be spanned by the thread.

Conveniently, part of the thread is stored on each tag by being lightly adhered thereto in a generally coiled or serpentine condition, and to that end the thread may to advantage be applied to the tags by a method in accordance with the first aspect of the invention.

Preferably, adjacent tags are, at the confluence, spaced from each other while still being connected by the thread.

The product may, for example, be infusion packages such as tea bags.

The invention also lies in an infusion package having a tag and thread attached thereto, wherein the tag is releasably attached to the package at one peripheral region of the latter, and the thread is firmly attached to the package at the opposite peripheral region of the latter, and to the tag.

Preferably, there is a generally coiled or serpentine portion of the thread, which is so retained on the tag, for example, by being lightly adhered thereto, as to be releasable from the tag.

The tag is conveniently shorter than the package so that there is a further portion of thread extending beyond the tag to the opposite peripheral region of the package.

Brief Description of the Drawings

The invention will now be described, by way of example only, with reference to the accompanying drawings in which:

Figure 1 is an isometric view of apparatus for performing the method of the invention;

Figure 2 is an enlarged view of part of the apparatus of Figure 1;

Figure 3 is a side elevational view of apparatus which is operable to form a series of tea bags, each with a tag attached, and which incorporates the apparatus of Figures 1 and 2;

Figure 4 is a plan view of a succession of tags, in the form of a continuous backing strip, to which thread has been applied by the apparatus; and

Figure 5 shows two of the tags after they have been separated and attached to their respective tea bags.

Detailed Description

With reference to Figures 1 and 3, the apparatus is provided with a reel 3 of a flexible substrate carrier strip 1 such as paper, woven or non-woven fabric. The material on the reel 3 is pre-printed with an adhesive and is fed to a thread application station 2 at which thread 4 from a coiled stock 6 is applied to the adhesive surface of the substrate. The substrate and thread are then fed to a further station 8 at which the substrate is separated into individual tags and attached to a succession of tea bags 10. The reel 3 is braked so as to cause the substrate 1 to be placed under tension as it is fed from the reel 3.

Before reaching the station 2, the substrate from the reel 3 is passed over steering rollers 16 and 20 and a roller 18 which is linked to a tension measuring device (not shown), and then passes through the nip between two rollers 22 and 24. As can be seen more clearly in Figure 2, the outer surface of the roller 22 is smooth and the surface of the roller 24 carries a series of equi-angularly spaced axial ridges, for example 28, which crush cut the substrate 1. As a result, the rollers 22 and 24 produce a series of cuts, each extending part way across the substrate 1, arranged at regular intervals on the substrate 1.

The substrate 1 is then passed to the nip between a roller 30 and a drum 32. Upstream of that nip, the drum 32 receives tabs of mylar tape from a roller 34 to which the tape is intermittently supplied from a reel 36 via steering rollers 38

and 40. Reference numeral 42 denotes one such tab. The tabs are held in position on the drum 32 by means of apertures 44 which are connected to a source of suction (not shown). As an alternative to mylar tape, the tabs could be formed from tape coated on one side with a hot melt adhesive.

The tabs, which are spaced at regular intervals around the surface of the drum 32, are positioned between two groups 46 and 48 of equi-angularly spaced radial protuberances on the drum 32. The axial spacing between the groups is slightly larger than the width of the substrate 1, and the protuberances in the group 48 can each be considered to form a respective pair with a corresponding protuberance in the group 46. Thus, the reference numerals 50 and 52 denote one such pair.

Rotation of the drum 32 (in the direction of the arrow 54) causes each pair of protuberances to move past a rotatable guide 56 to which the thread 4 is supplied via a tension wheel 58. The guide 56 takes the form of a ring which has a peripheral axial aperture 60 through which the thread 4 passes and which is positioned at a distance of 0.2 mm plus the radial height of the protuberances from the drum. The ring 56 is rotated in a clockwise direction (as viewed from Figure 2) about its axis which causes the aperture 60 (and hence the thread 4 passing therethrough) to travel in a circular orbit, the diameter of which is slightly greater than the distance between the groups 46 and 48 of protuberances. Consequently, as the drum 32 rotates, the guide 56 successively winds the thread 4 around the protuberances as the latter pass the guide 56.

The speed of rotation of the guide 56 and drum 32 are related to the formula

$$\frac{\omega_{drum} \times r_{drum} = V_{disc}}{10}$$

Where ω_{drum} is the angular velocity of the drum 32

r_{drum} is the radius of the drum 32
V_{disc} is the rotational speed (revolutions per minute) of the disc

One revolution of the drum 32 provides sufficient length of thread (on its protuberances) for five tags, and the guide 56 therefore rotates through two revolutions for each tag.

The relative speeds of rotation of the guide 56 and drum 32 are such that the thread 4 passes around the protuberances in the group 48 since the latter are moving in the opposite direction to the aperture 60 when the thread is applied thereto, and the thread is looped around each of the protuberances in the group 46 since those protuberances are travelling in the same direction as the aperture 60 when the thread 4 is applied. A portion of the thread which has been applied to the protuberances will also overlie a respective tab, such as a tab 42.

The drum 32 is heated to a temperature of 175-200° centigrade, causing the mylar tabs to adhere to the substrate 1 as the tabs pass through the nip between the rollers 30 and 32. The tabs therefore also adhere the thread 4 to the substrate 1 at regular intervals. In addition, the thread 4 is brought into contact with the pre-printed adhesive surface on the substrate 1 and therefore becomes lightly adhered to the latter at regions between the mylar tabs. Consequently, as the reel 1 passes beyond the nip of the rollers 30 and 32, it removes the thread 4 from the protuberances on the drum 32.

The substrate, thread and mylar tabs then pass to the nip between a pair of isolation rollers 62, and then to the nip between a further pair of rollers 64.

Figure 4 shows a first portion of the substrate 1 (referenced 65) which has left the drum 32 and roller 30, but has yet to reach the rollers 64, and two tabs (referenced 70 and 71) which

have passed through the rollers 64.

In Figure 4, the reference numerals 66 and 68 denote cut lines which were applied by the rollers 22 and 24, and which define the interface between adjacent tabs on the substrate 1. The reference numerals 73, 75 and 77 therefore each denote what will become a respective one of four tabs obtained from the portion of substrate 1 shown in Figure 4. The substrate 1 is fed to the rollers 62 in the direction denoted by the arrow A, and each said portion of the substrate carries a respective mylar tab, such as 72 and 74, positioned in the vicinity of the trailing edge of the substrate portion. There is nevertheless a trailing portion of thread 4 between the mylar tab and the interface with the next tag. Reference numerals 78 and 80 denote two such portions.

The spacing between the nips of the pairs of rollers 62 and 64 corresponds to the spacing between adjacent cut lines in the substrate 1, and the rollers 64 rotate at a higher speed than the rollers 62. Consequently, as soon as the leading edge of the portion 73 reaches the nip between the rollers 64, the portion 73 is therefore pulled away from the rest of the substrate portion 65, causing it to be severed therefrom along the cut line 66. As this happens, the portion of thread 78 is detached from the substrate 1 to allow the tab now defined by the portion 73 to be separated from the rest of the portion 65. As this happens, the portion of the thread 4 still stuck to the tab portion 75 is retained in position by the rollers 62. This process is repeated as each tab portion in turn reaches the nip between the rollers 64, which accordingly act as separation means for separating the substrate 1 into a plurality of tags.

The separated tabs (which are still connected to the thread 4) are then transferred to a heated roller 82 which is in contact with one of the rollers 64, and therefore rotates with an angular speed which is such that the circumferential speed of the roller 82 matches that of the one of the rollers 64 in

contact therewith.

Mylar tabs are also supplied to the roller 82 from a reel 84 via rollers 86 and 88 to a position upstream of the rollers 64. Those tabs can be held in position by similar mechanism as that used by the drum 32. The further tabs can be supplied intermittently or continuously using a backing strip on which the tabs are positioned at intervals.

With reference to Figures 1 and 3, the tea bags 10 are formed from a continuous web of a suitable perforated material (such as paper) travelling in the direction of the arrow B. After receiving tea leaves, the web passes through heated rollers 84 to form a sleeve having an upper seam 86. The sleeve then passes to a pair of heated rollers 88 and 89 which include equi-angularly spaced jaws (not shown) which seal the sleeve of material across its width at intervals to define a series of contiguous tea bags which then pass to the rollers 90 and 82, both of which are also heated.

The operation of the system is such that each tea bag is in registry with a respective tab and length of released thread (for example 80) connecting that tab to the previous tab. The operation of the rollers will be described firstly in relation to the tag 73 and its associated tea bag.

Firstly, the rollers 82 and 90 press a mylar tab 92 (supplied from the reel 84) against the leading region of the thread 80 and the leading edge of the tea bag, shown at 94 in Figure 5, thereby firmly to attach the end portion of the thread to the leading edge of the tea bag 94. As the tag 73 and the trailing edge of the tea bag 94 pass between the rollers 82 and 90, the latter urge the end of the tag against the tea bag so that some of the adhesive pre-printed on the tag causes the latter to the lightly adhered to the trailing edge of the tea bag. The tea bag 94 then advances to a pair of cutting rollers 96 which cut through the bag material and the thread at the interface

between the tea bag 94 and the adjacent tea bags, so as to separate the tea bags from each other.

As will be appreciated from Figure 5, each completed tea bag includes a tag which is lightly adhered to one end of the tea bag, and is firmly attached to a length of thread, for example at 72. The thread is also firmly attached to the opposite end of the tea bag, for example at 92, and a generally serpentine portion of the thread, for example 98 is lightly adhered to the tag and sandwiched between the tag and the tea bag.

A length of thread for each tea bag is thus at least initially retained against the latter so that the length of thread cannot readily become entangled with other lengths of thread. A user can simply detach the tag from the end of the tea bag and pull the tag away from the tea bag so as to release the portion of thread stored against the tag.

Claims

1. A method of providing each of a plurality of tags with a respective length of thread for attaching the tag to a product, the method comprising the steps of:

a) Feeding the thread to an array of protuberances via a rotating guide for causing orbital motion of the thread being fed to the protuberances;

b) During said feeding, causing relative movement of the array of protuberances and the guide so that the protuberances move past the orbital path of the thread such that the thread is applied to the protuberances which retain the thread in a generally coiled or serpentine condition; and

c) Transferring the thread from the protuberances to the tags and attaching the thread to the latter.

2. A method according to claim 1, in which step c) of the method comprises the steps of firmly attaching a respective first portion of each length of thread to its respective tag, and lightly adhering a respective second portion of each length to the tag, wherein the second portion is releasably retained on the tag in its generally coiled or serpentine condition, and wherein the length of thread includes a third portion, spaced from the first portion by the second portion, available for attachment to the respective product.

3. A method according to claim 2, in which the tags are contiguously arranged when the thread is transferred from the protuberances.

4. A method according to claim 3, in which the thread is continuously transferred from the protruberances.

5. A method according to claim 3 or claim 4, in which the thread is transferred from the protuberances to a carrier strip which is subsequently separated into portions, each of which constitutes a respective tag.

6. A method according to claim 5, in which the thread for the tags is continuous when it is applied to the strip, and then cut to provide individual lengths.

7. A method according to claim 6, in which the thread is not cut before it is attached to the product.

8. A method according to any of claims 5 to 7, in which during the separation of portions of the strip to form the tags, part of the lightly adhered thread is released from the tags so that the third portion of each length of thread is spaced from its respective tag.

9. A method according to claim 8, in which the method comprises the further steps of attaching each tag and the third portion of thread to a respective product each tag being attached at or near one peripheral region of the product, and the third portion of the thread to the opposite peripheral region of the product.

10. A method according to any of the preceding claims, in which the orbital motion of the thread being fed from the guide to the protuberances is circular about the axis of rotation of the guide.

11. A method according to any of the preceding claims, in which the protuberances are arranged in staggered pairs, the members of each of which are positioned one on either side of the axis of rotation of the guide as that pair moves past the guide, and the relative movement of the guide and the protuberances is such that the pairs of protuberances receive the thread in succession.

12. A method according to claim 11, in which the rotational speed of the guide and speed of said relative movement are such that, for each pair of protuberances, the thread passes part way round one of the protuberance, and is looped around the other protuberance.

13. A method according to any of the preceding claims, in which the protuberances are mounted on a drum, and said relative movement is achieved by rotating the drum about its axis.

14. A method according to claim 13, in which each length of thread is firmly attached to its respective tag at its first region by the steps of applying a respective adhesive tab to a portion of the drum which is not carrying any thread, so that the thread subsequently applied to that portion overlies the tab, and subsequently applying the tab to the tag such that the first portion of the thread is sandwiched between tab and tag.

15. Apparatus for performing the method of the first aspect of the invention, the apparatus comprising feed means for feeding thread to an array of protuberances, the feed means comprising a guide and means for rotating the guide so that the direction of feed of the thread moves about an orbital path, means for moving the protuberances such that they move past said orbital path, wherein the relative positions of the guide and the protuberances are such that the thread is applied to and retained on the protuberances in a generally serpentine or coiled condition, tag supply means for supplying a succession of tags to those protuberances on which the thread is retained and transfer means for transferring the thread from the protuberances to the tags and attaching thread thereto.

16. Apparatus according to claim 15, in which the apparatus is adapted for use with tags which carry an adhesive coating, the transfer means being arranged to bring the thread, retained on the protuberances, into contact with the adhesive coatings.

17. Apparatus according to claim 15 or claim 16, in which the transfer means comprises adhesive tab supply means for supplying adhesive tabs to the thread and application means for applying the tabs to the tags thereby to attach the thread to the latter.

18. Apparatus according to claim 17, in which the tag supply means is operable to supply a continuous support strip to the thread on the protuberances, the transfer means is operable to transfer the thread from the protuberances to the strip, and the apparatus includes separation means for subsequently separating the strip into a plurality of portions, each constituting a respective tag which carries a respective length of thread.

19. Apparatus according to any one of claims 15 to 18, in which the protuberances are mounted on a drum, from which they project radially, the drum axis being preferably perpendicular to the axis of rotation of the guide, and the means for moving the protuberances relative to the guide comprises rotation means for rotating the drum.

20. Apparatus according to claim 18, when appended to claim 17, in which the tab supply means preferably comprises the drum, the arrangement being such that for each revolution of the drum, at least one tab is applied to a respective portion of the drum before the thread is applied to that portion, the drum including tab retaining means for retaining each tab thereon at least until the tab is brought into contact with the thread.

21. Apparatus according to claim 20, in which the retaining means comprises a series of apertures which are in the drum and which are connected to suction means, operable to retain said tabs on the drum until they are attached to the thread.

22. A method of attaching a series of tags, each being firmly

attached to a respective portion of thread, to a series of corresponding products, the method comprising the steps of feeding a stream of the tags and thread to a stream of products, each product having a leading peripheral region and a trailing peripheral region which are respectively the first and last portion of the product to reach the confluence of the streams, releasably attaching each tag to its respective product and firmly attaching the associated length of thread to the product so that the tags can be separated from the product while still being connected thereto by the thread, wherein the tag and/or the thread spans the product from the leading to the trailing peripheral region.

23. A method according to claim 22, in which each tag is releasably attached to the product at either the leading or the trailing peripheral region on its respective product, and the thread is firmly attached to the opposite peripheral region of the product.

24. A method according to claim 23, in which the tag is releasably attached to the trailing peripheral region of the product, and the thread is firmly attached to the leading peripheral region of the product.

25. A method according to any of claims 23 or 24, in which the tag is too small to span the product from the leading to the trailing peripheral region, and only part of the product between the two regions is spanned by the tag and the rest is spanned by the thread.

26. A method according to any one of claims 22 to 25, in which part of the thread is stored on each tag by being lightly adhered thereto in a generally coiled or serpentine condition.

27. A method according to claim 26, in which the thread is applied to the tags by a method in accordance with any of claims 1 to 14.

28. A method according to any of claims 22 to 27, in which adjacent tags are, at the confluence, spaced from each other while still being connected by the thread.

29. An infusion package having a tag and thread attached thereto, wherein the tag is releasably attached to the package at one peripheral region of the latter, and the thread is firmly attached to the package at the opposite peripheral region of the latter, and to the tag.

30. An infusion package according to claim 28 in which there is a generally coiled or serpentine portion of the thread, which is so retained on the tag, for example, by being lightly adhered thereto, as to be releasable from the tag.

31. An infusion package according to claim 30, in which the tag is shorter than the package so that there is a further portion of thread extending beyond the tag to the opposite peripheral region of the package.

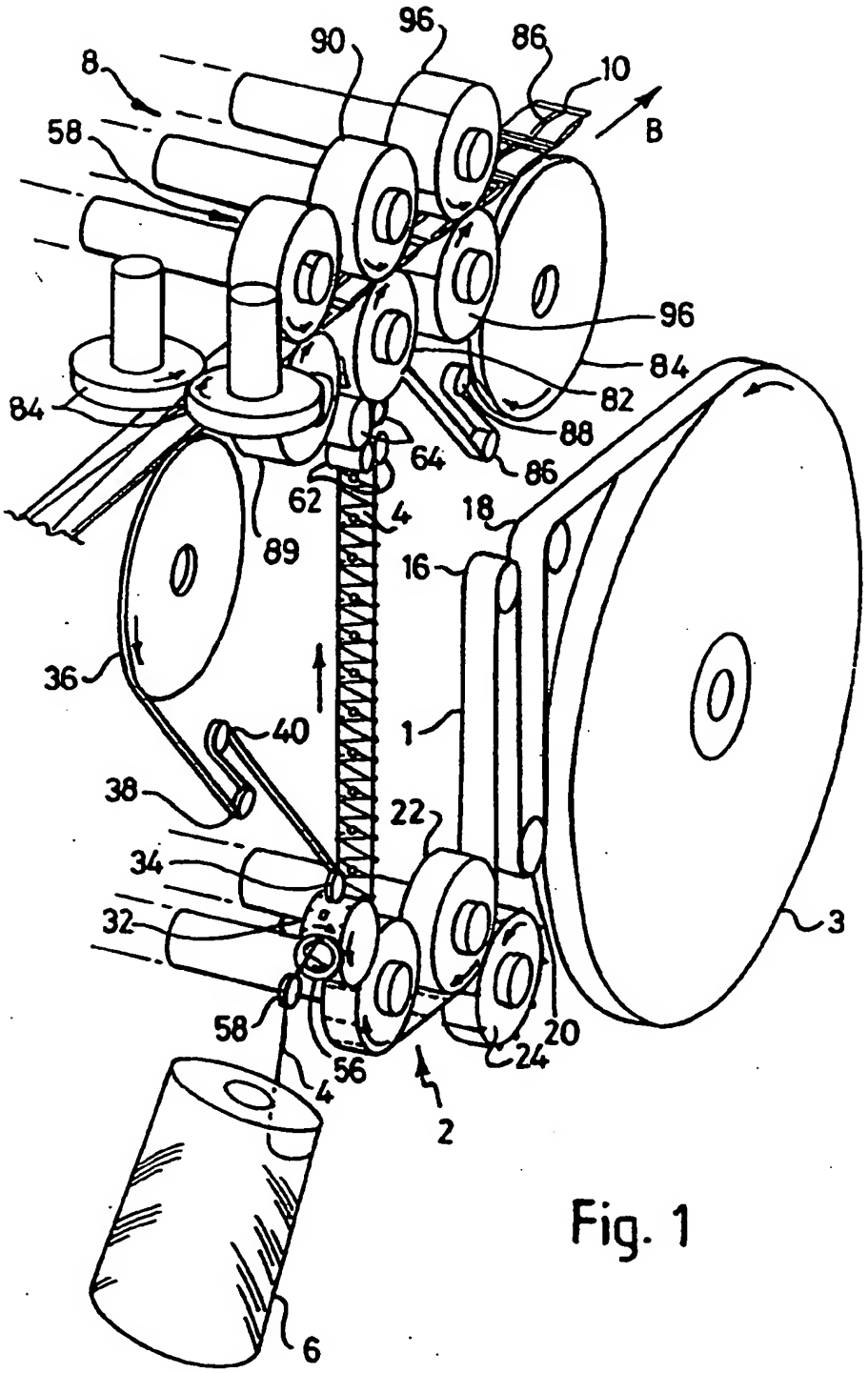
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Fig. 1

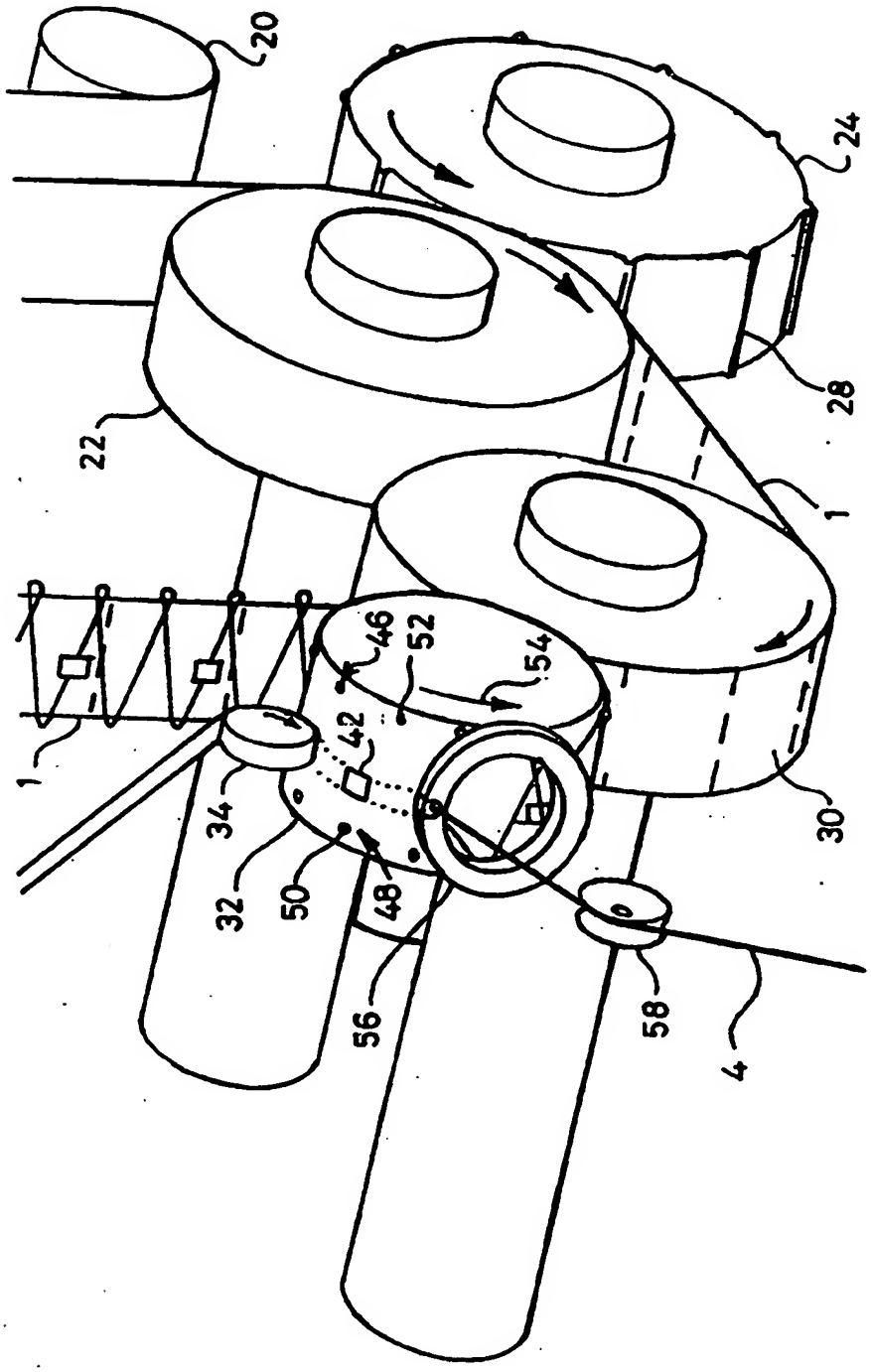
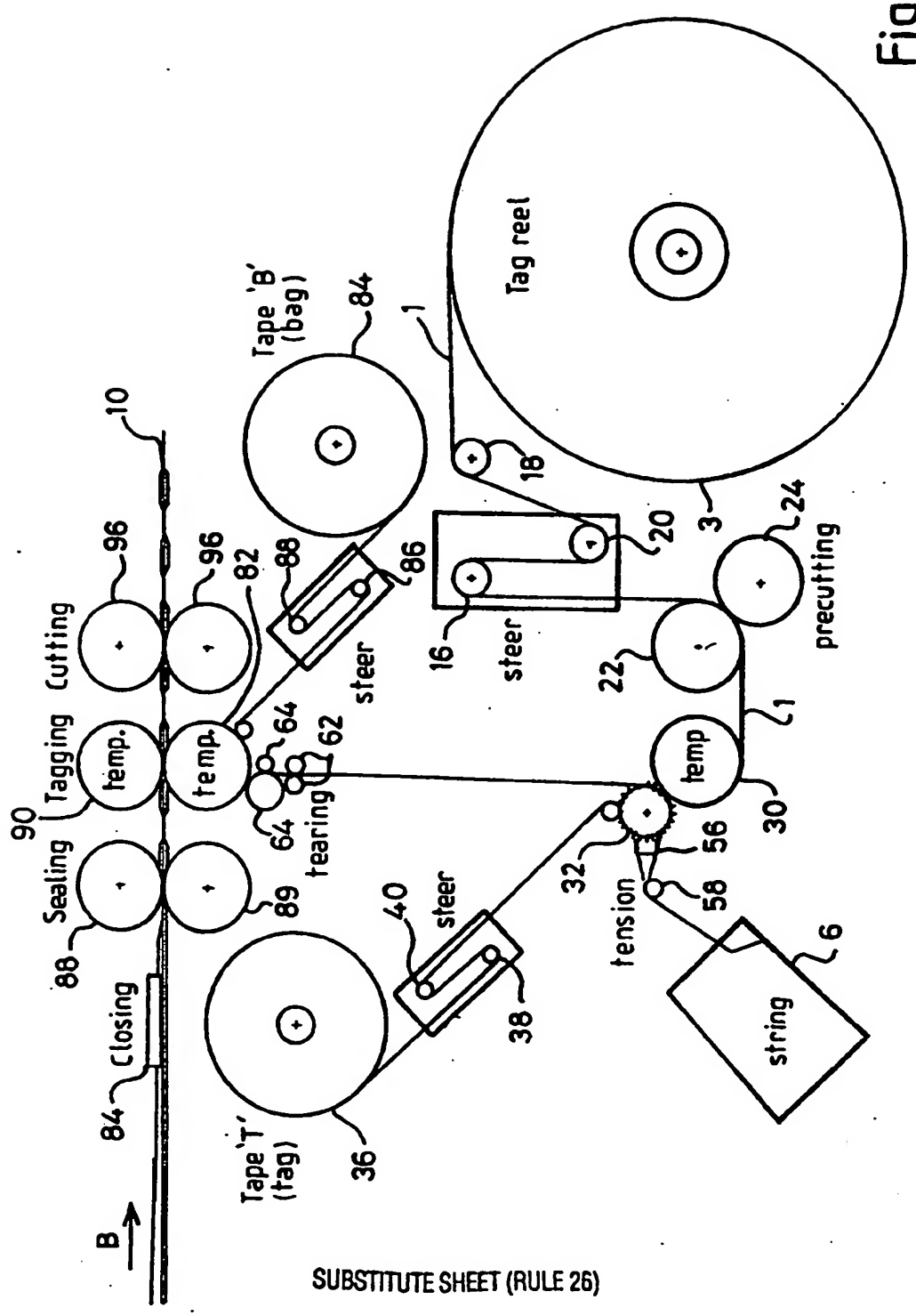


Fig. 2


Tag reel
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string
Closing
84
Tape 'T' (tag)
36
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Fig. 3

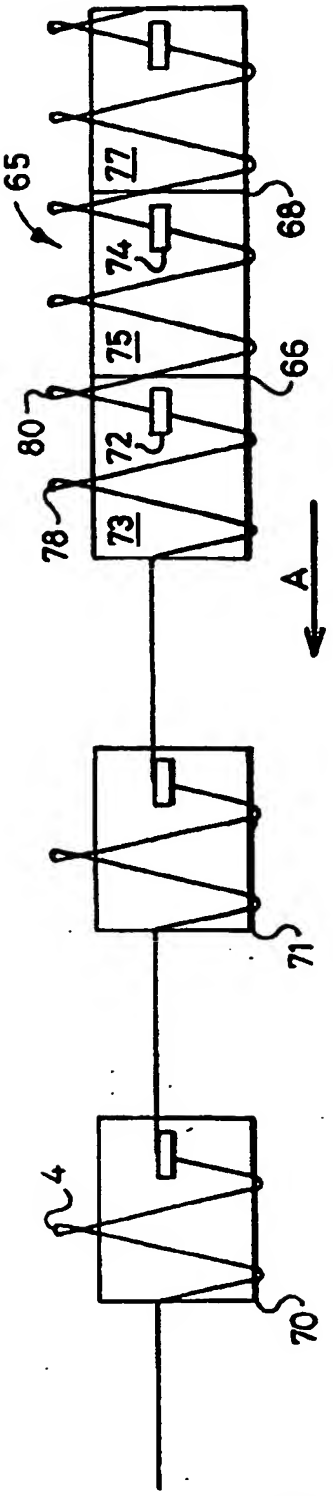

Fig. 4

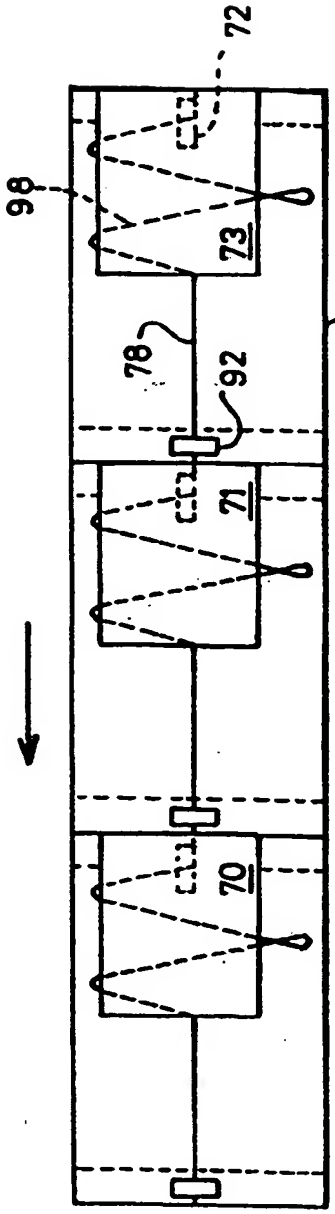

Fig. 5

Claims

1. A method of providing each of a plurality of tags with a respective length of thread for attaching the tag to a product, the method comprising the steps of:

a) Feeding the thread to an array of protuberances via a rotating guide for causing orbital motion of the thread being fed to the protuberances;

b) During said feeding, causing relative movement of the array of protuberances and the guide so that the protuberances move past the orbital path of the thread such that the thread is applied to the protuberances which retain the thread in a generally coiled or serpentine condition; and

c) Transferring the thread from the protuberances to the tags and attaching the thread to the latter.

2. A method according to claim 1, in which step c) of the method comprises the steps of firmly attaching a respective first portion of each length of thread to its respective tag, and lightly adhering a respective second portion of each length to the tag, wherein the second portion is releasably retained on the tag in its generally coiled or serpentine condition, and wherein the length of thread includes a third portion, spaced from the first portion by the second portion, available for attachment to the respective product.

3. A method according to claim 2, in which the tags are contiguously arranged when the thread is transferred from the protuberances.

4. A method according to claim 3, in which the thread is continuously transferred from the protruberances.

5. A method according to claim 3 or claim 4, in which the thread is transferred from the protuberances to a carrier strip which is subsequently separated into portions, each of which constitutes a respective tag.

6. A method according to claim 5, in which the thread for the tags is continuous when it is applied to the strip, and then cut to provide individual lengths.

7. A method according to claim 6, in which the thread is not cut before it is attached to the product.

8. A method according to any of claims 5 to 7, in which during the separation of portions of the strip to form the tags, part of the lightly adhered thread is released from the tags so that the third portion of each length of thread is spaced from its respective tag.

9. A method according to claim 8, in which the method comprises the further steps of attaching each tag and the third portion of thread to a respective product each tag being attached at or near one peripheral region of the product, and the third portion of the thread to the opposite peripheral region of the product.

10. A method according to any of the preceding claims, in which the orbital motion of the thread being fed from the guide to the protuberances is circular about the axis of rotation of the guide.

11. A method according to any of the preceding claims, in which the protuberances are arranged in staggered pairs, the members of each of which are positioned one on either side of the axis of rotation of the guide as that pair moves past the guide, and the relative movement of the guide and the protuberances is such that the pairs of protuberances receive the thread in succession.

12. A method according to claim 11, in which the rotational speed of the guide and speed of said relative movement are such that, for each pair of protuberances, the thread passes part way round one of the protuberance, and is looped around the other protuberance.

13. A method according to any of the preceding claims, in which the protuberances are mounted on a drum, and said relative movement is achieved by rotating the drum about its axis.

14. A method according to claim 13, in which each length of thread is firmly attached to its respective tag at its first region by the steps of applying a respective adhesive tab to a portion of the drum which is not carrying any thread, so that the thread subsequently applied to that portion overlies the tab, and subsequently applying the tab to the tag such that the first portion of the thread is sandwiched between tab and tag.

15. Apparatus for performing the method of the first aspect of the invention, the apparatus comprising feed means for feeding thread to an array of protuberances, the feed means comprising a guide and means for rotating the guide so that the direction of feed of the thread moves about an orbital path, means for moving the protuberances such that they move past said orbital path, wherein the relative positions of the guide and the protuberances are such that the thread is applied to and retained on the protuberances in a generally serpentine or coiled condition, tag supply means for supplying a succession of tags to those protuberances on which the thread is retained and transfer means for transferring the thread from the protuberances to the tags and attaching thread thereto.

16. Apparatus according to claim 15, in which the apparatus is adapted for use with tags which carry an adhesive coating, the transfer means being arranged to bring the thread, retained on the protuberances, into contact with the adhesive coatings.

17. Apparatus according to claim 15 or claim 16, in which the transfer means comprises adhesive tab supply means for supplying adhesive tabs to the thread and application means for applying the tabs to the tags thereby to attach the thread to the latter.

18. Apparatus according to claim 17, in which the tag supply means is operable to supply a continuous support strip to the thread on the protuberances, the transfer means is operable to transfer the thread from the protuberances to the strip, and the apparatus includes separation means for subsequently separating the strip into a plurality of portions, each constituting a respective tag which carries a respective length of thread.

19. Apparatus according to any one of claims 15 to 18, in which the protuberances are mounted on a drum, from which they project radially, the drum axis being preferably perpendicular to the axis of rotation of the guide, and the means for moving the protuberances relative to the guide comprises rotation means for rotating the drum.

20. Apparatus according to claim 18, when appended to claim 17, in which the tab supply means preferably comprises the drum, the arrangement being such that for each revolution of the drum, at least one tab is applied to a respective portion of the drum before the thread is applied to that portion, the drum including tab retaining means for retaining each tab thereon at least until the tab is brought into contact with the thread.

21. Apparatus according to claim 20, in which the retaining means comprises a series of apertures which are in the drum and which are connected to suction means, operable to retain said tabs on the drum until they are attached to the thread.

22. A method of attaching a series of tags, each being firmly

attached to a respective portion of thread, to a series of corresponding products, the method comprising the steps of feeding a stream of the tags and thread to a stream of products, each product having a leading peripheral region and a trailing peripheral region which are respectively the first and last portion of the product to reach the confluence of the streams, releasably attaching each tag to its respective product and firmly attaching the associated length of thread to the product so that the tags can be separated from the product while still being connected thereto by the thread, wherein the tag and/or the thread spans the product from the leading to the trailing peripheral region.

23. A method according to claim 22, in which each tag is releasably attached to the product at either the leading or the trailing peripheral region on its respective product, and the thread is firmly attached to the opposite peripheral region of the product.

24. A method according to claim 23, in which the tag is releasably attached to the trailing peripheral region of the product, and the thread is firmly attached to the leading peripheral region of the product.

25. A method according to any of claims 23 or 24, in which the tag is too small to span the product from the leading to the trailing peripheral region, and only part of the product between the two regions is spanned by the tag and the rest is spanned by the thread.

26. A method according to any one of claims 22 to 25, in which part of the thread is stored on each tag by being lightly adhered thereto in a generally coiled or serpentine condition.

27. A method according to claim 26, in which the thread is applied to the tags by a method in accordance with any of claims 1 to 14.

28. A method according to any of claims 22 to 27, in which adjacent tags are, at the confluence, spaced from each other while still being connected by the thread.

29. An infusion package having a tag and thread attached thereto, wherein the tag is releasably attached to the package at one peripheral region of the latter, and the thread is firmly attached to the package at the opposite peripheral region of the latter, and to the tag.

30. An infusion package according to claim 28 in which there is a generally coiled or serpentine portion of the thread, which is so retained on the tag, for example, by being lightly adhered thereto, as to be releasable from the tag.

31. An infusion package according to claim 30, in which the tag is shorter than the package so that there is a further portion of thread extending beyond the tag to the opposite peripheral region of the package.

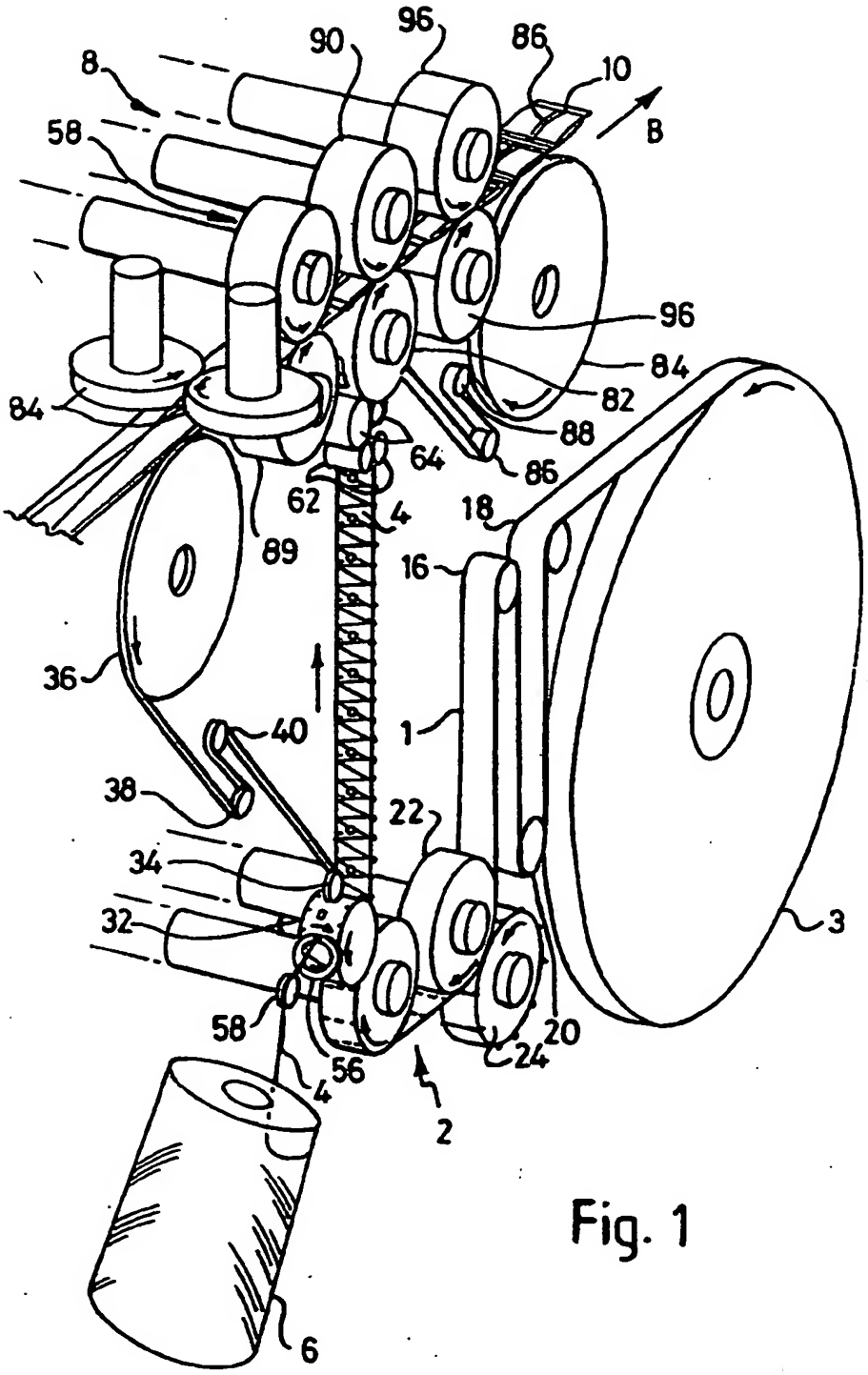
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Fig. 1

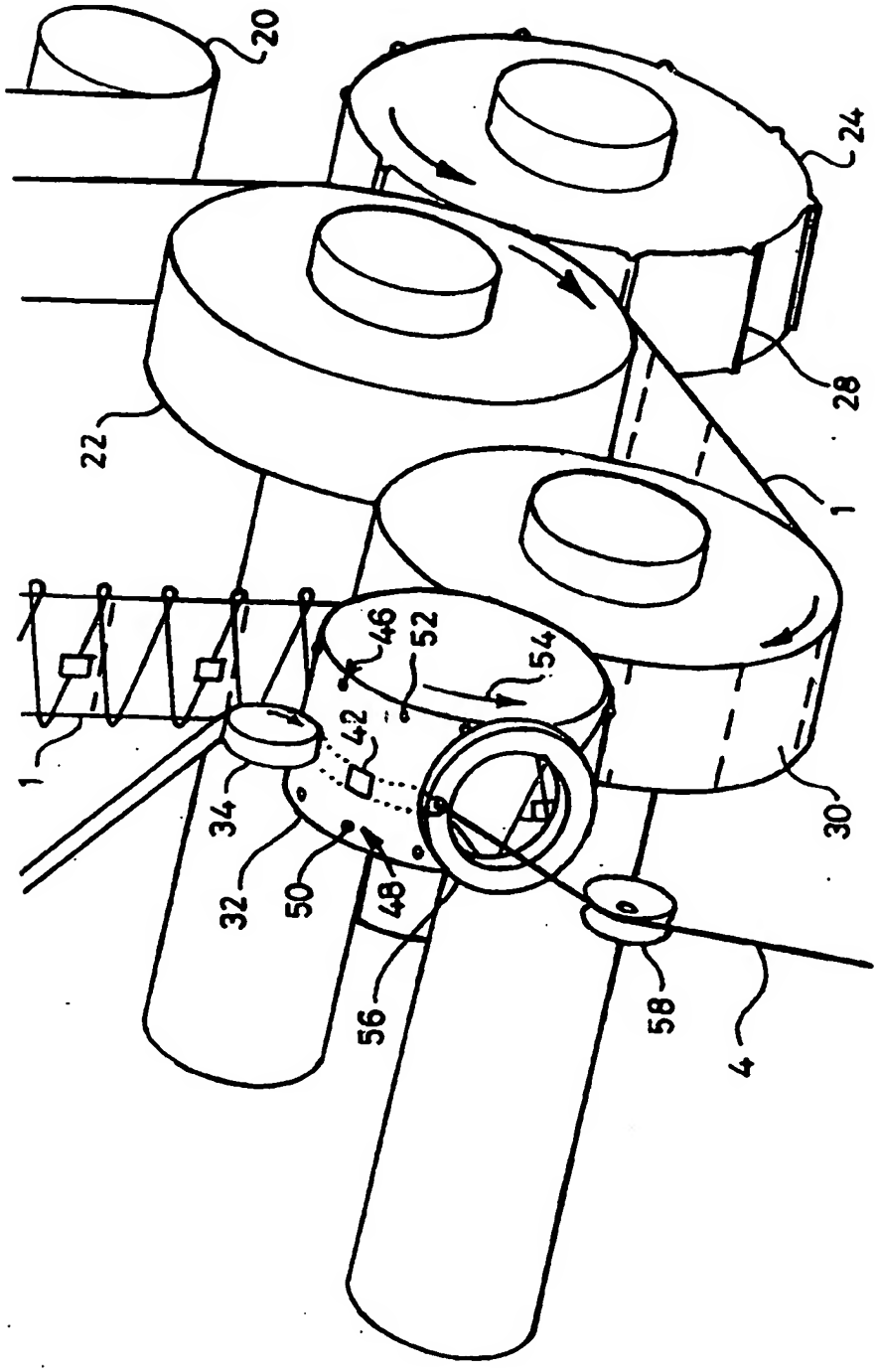
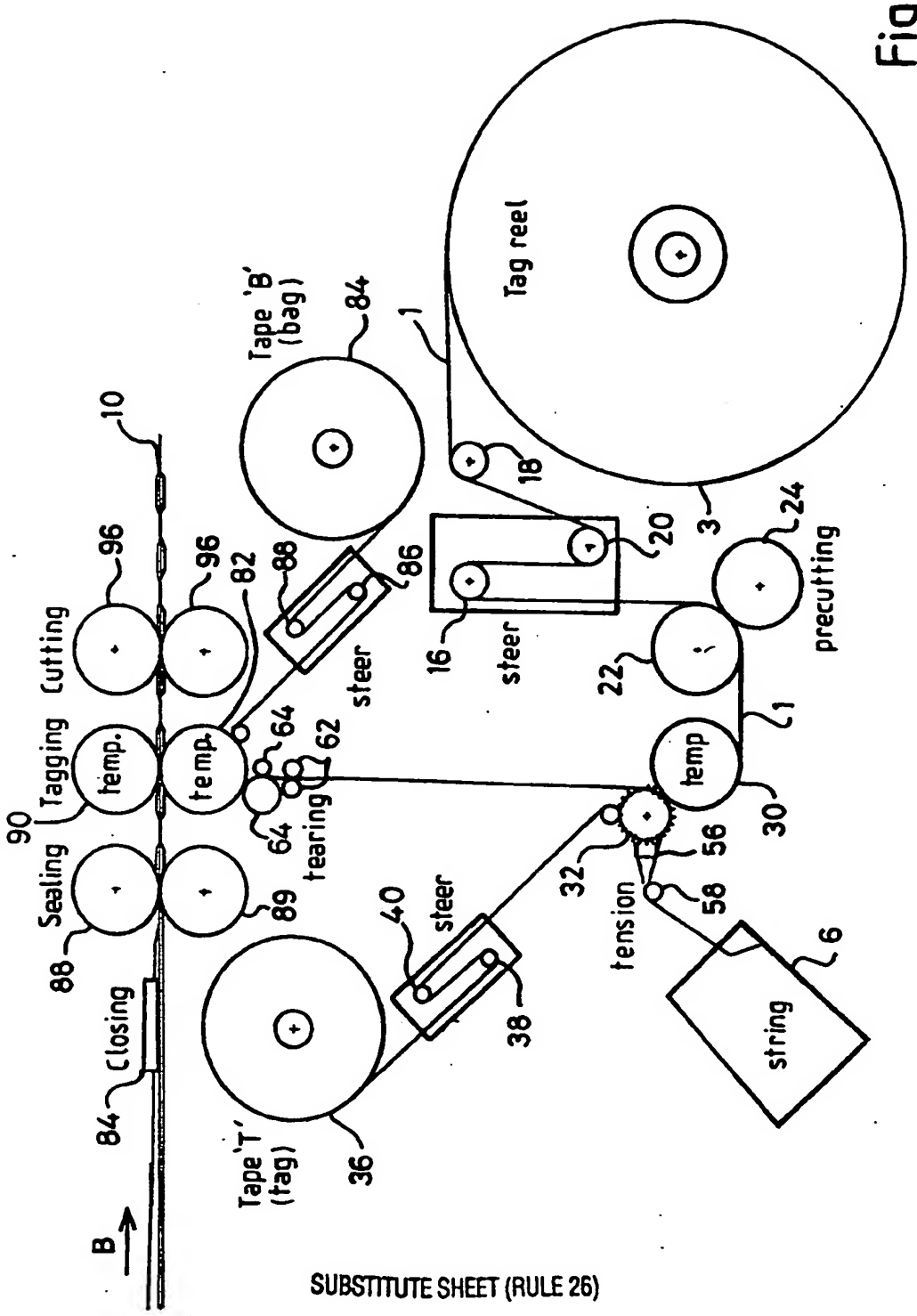


Fig. 2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16
steer
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Tagging
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temp.
64
62
temp
30
90
64
tearing
1
56
Sealing
88
89
40
steer
32
58
tension
6
string
Closing
84
38
Tape 'T' (tag)
36
B

Fig. 3

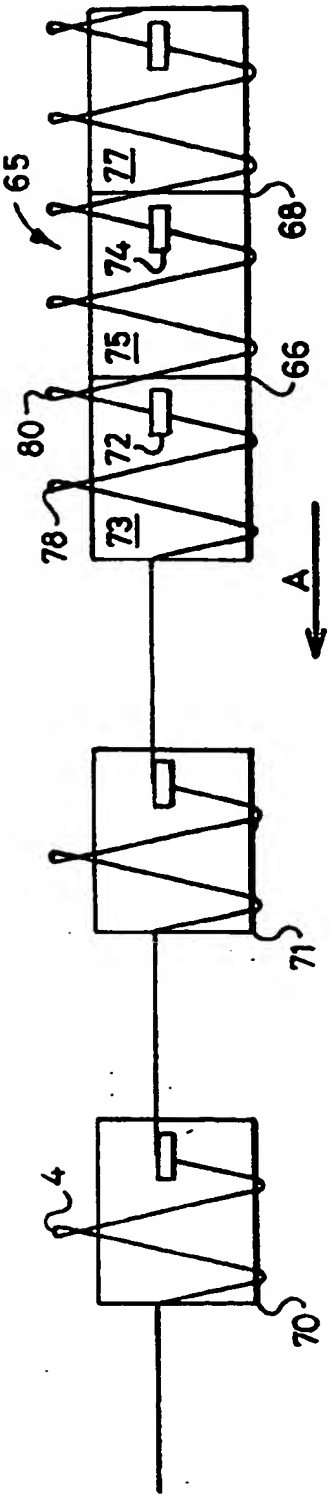

Fig. 4

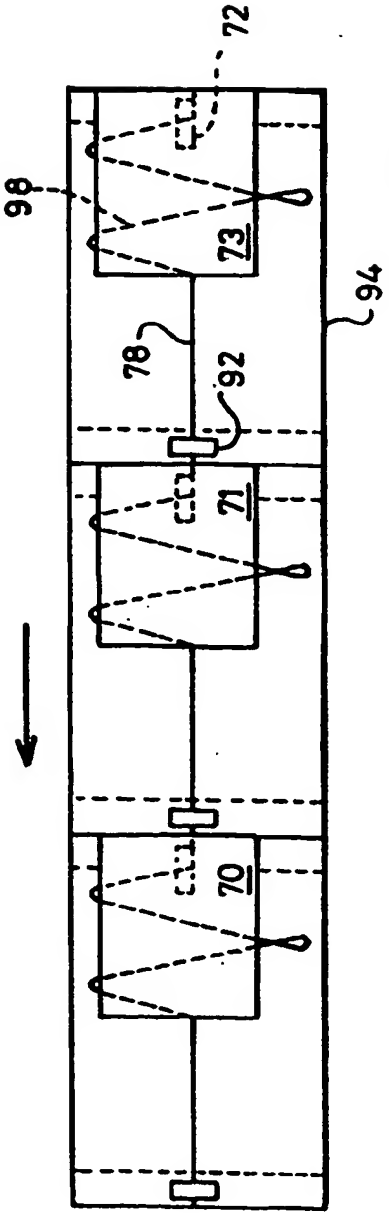

Fig. 5